2019 WASTEWATER SUMMARY REPORT

TOWN OF ST. MARYS WASTEWATER TREATMENT AND COLLECTION

JANUARY 1, 2019 THROUGH DECEMBER 31, 2019

ENVIRONMENTAL SERVICES

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FACILITY FACTS

Facility:	*Anoxic/Oxic Biological Nutrient Removal (A/O BNR) System with Integrated Sludge Management*
ECA:	4934-AH9S98 (issued February 24, 2017)
Design Capacity:	
Average Daily Flow:	5,560 m^3/day
Peak Daily Flow:	14,250 m^3/day
Facility Classification	
Treatment Plant:	Wastewater Treatment 3 [WWT3] (Revised Sept. 7, 2017)
Collection System:	Wastewater Collection 2 [WWC2]
Receiving Water:	Thames River – North Branch

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1.0 SYSTEM OVERVIEW

The St. Marys Wastewater Treatment Plant completed a Sludge Management Upgrade in 2010. The upgrade included conversion of the existing extended aeration activated sludge type system to an anoxic/oxic biological nutrient removal system with integrated sludge management. The system consists of the following:

Raw Sewage Conveyance:

Raw sewage typically flows by gravity throughout the system to the wastewater treatment plant. Where gravity flow is not possible due to elevation restrictions, raw sewage flows by gravity to each of the three pump stations that service the Town of St, Marys and from there is pumped to the wastewater treatment plant. The three pump stations are located as follows:

- Emily Street Pump Station consisting of 2, 30 HP pumps controlled by floats with high level float alarm.
- Robinson Street Pump Station consisting of 2, 7.5 HP pumps controlled by milltronics with high level float alarm and an emergency back-up generator.
- Queen Street Pump Station consisting of 2, 10 HP pumps controlled by milltronics with high level float alarm and an emergency back-up generator.

Robinson Street Pumping Station

Inlet Works:

Sewage flows from the collection system and the three pump stations into the wet well through automatic bar screens then through a grit tank and communitor, the grit is conveyed to a bin sent to landfill. Sewage then flows by sewer piping to the anoxic tanks.

Anoxic Tanks:

Sewage is split between two round tanks with submersible mixers.

Aeration Tanks:

Sewage enters an inlet chamber where flows are split to three distribution chambers which feed three aeration basins operating in parallel. In 2015 there was a 150 HP turbo blower installed to provide a minimum 2,506 m3 of air/hour to replace one of the centrifugal blowers.

Neuros Blower

Aeration Tank

Secondary Clarifiers:

Sewage is split in to four centre feed round clarifiers, two of which are presently in operation. During high flow conditions the other two clarifiers are put into service. Return activated sludge collected here can be transferred from the clarifiers to the aeration or waste activated equalization tanks which are the holding tanks for the sludge thickening process.

Secondary Clarifier

Disinfection and Discharge:

Effluent passes through two ultraviolet lamp arrays containing a total of 112 lamps. A sodium hypochlorite liquid feed system is provided for backup chlorination in the event of UV failure. Final effluent is discharged via pipe to the outfall on the bank of the Thames River.

Biosolids Handling

Waste activated sludge is pumped from the WASEQ tanks (waste activated sludge equalization) into two sludge storage tanks that were previously used as digesters. Supernate is taken off the top of the storage tanks to thicken the sludge. The sludge from these storage tanks is then dosed with polymer and then processed through the centrifuge. The dewatered sludge produced by the centrifuge is then run through the Lystek process. The Biosolids are then mixed with potassium hydroxide in a heated mixing tank and processed.

Product from the mixing tank is pumped to a mixed storage tank equipped with an activated carbon odour control system. Biosolids are loaded to the tanker from an overhead hose. The loading area is equipped with curbing and graded to catch basins tied into the Works.

Lystek Process

Lystek Chemical Feed System

Phosphorus Removal:

One phosphorus removal system capable of processing internal recycle streams consisting of one polymerized aluminum sulphate feed system consisting of two chemical feed pumps discharging into the channel of the outlet of the aeration tanks.

Standby Power

The wastewater treatment plant has an automatic standby generator which will operate the plant when there is a power failure. This allows for manual running of the plant when power outages occur.

2.0 SUMMARY OF MONITORING DATA

The St. Marys Wastewater Treatment Plant was monitored as per the Environmental Compliance Approval #4934-AH9S98 issued February 24, 2017.

Detailed monitoring data is supplied in Appendix A.

2.1 Wastewater Monitoring

The raw wastewater is monitored for BOD_5, total suspended solids, total phosphorus, total ammonia nitrogen, alkalinity and total kjeldahl nitrogen weekly by composite sample. E-coli is monitored weekly by a grab sample. Dissolved oxygen, PH and temperature are monitored daily Monday to Friday. The plant was designed based on typical raw water characteristics.

Effluent is sampled on a weekly basis and tested for CBOD5, suspended solids, total phosphorus and total ammonia nitrogen as a composite sample. A grab sample is taken weekly and tested for E. coli. Unionized ammonia is calculated weekly. These parameters specified in the ECA were analyzed by SGS Lakefield; which is an accredited laboratory in Ontario. In-house tests are conducted by licensed operators for monitoring purposes using Standard Methods and the data generated from these tests is used to determine the treatment efficiency while maintaining process control; these include pH, temperature and DO which is mandatory Monday to Friday as well as phosphorus, ammonia, total suspended solids and settling tests. These tests will help the operators to meet the effluent objectives and limits by adjusting processes.

To ensure *"the effluent from the works is free from floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam or discolouration on the receiving waters"* staff visually inspect the process tanks on a daily basis to ensure this is being met. In the event of high foam situations in the aeration tank a vacuum truck is called in to clean the tanks to prevent any solids from entering the receiving streams.

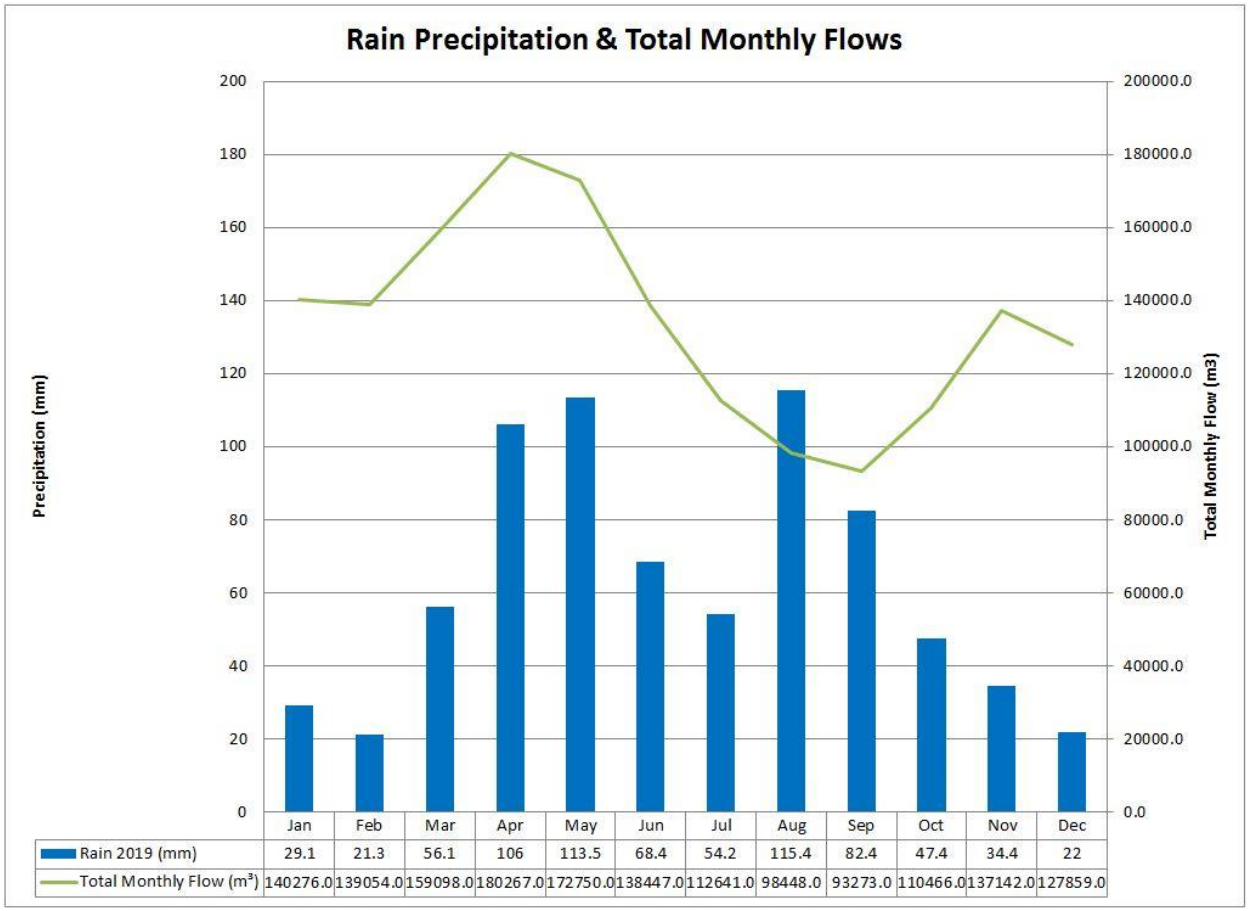
Refer to ***Appendix A*** for more detailed monthly results.

There was a Ministry of Environment, Conservation and Parks Inspection on November 29, 2017. There were no non-compliances for the reporting period.

The total flow treated at the treatment plant was 1,609,721 m³. The average daily flow for raw wastewater was 4,416.46 m³/d. This represents 78.7% of the design capacity of 5,560 m³/d. The maximum daily flow was 8,748 m³ which occurred on March 15, 2019. This was related to heavy rains.

There were 55 days where the rated capacity of 5,560 m3/day was exceeded, these occurred in the months of January, February, March, April, May, June and November and were all related to wet weather conditions. The peak flow rate of 14,250 m3 was not exceeded in 2019.

According to the Stratford weather station in 2019, there was a total of 750.2 mm of rain and 904.5 mm in 2018. Total snow in 2019 was 159.5 mm and 155.5 mm in 2018.



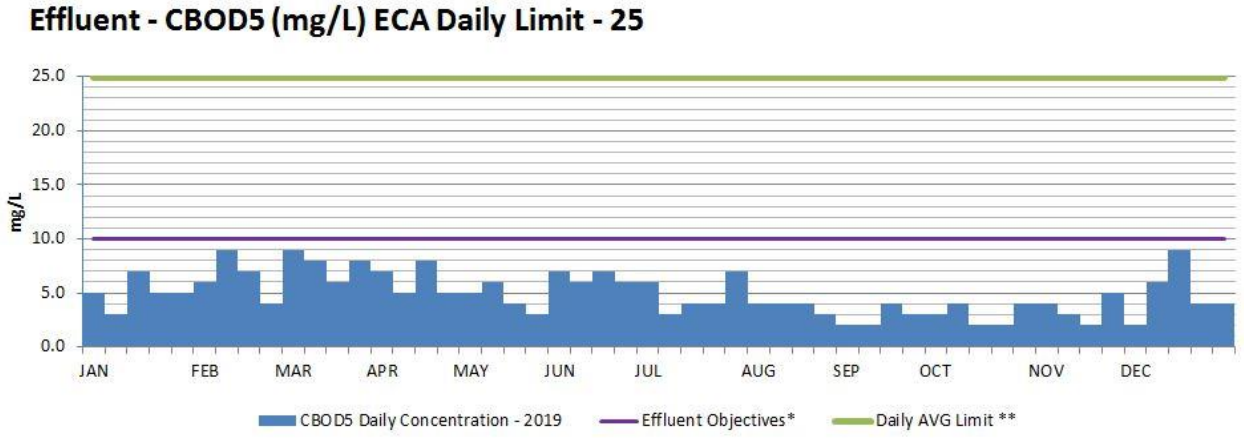
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rain 2019 (mm)	29.1	21.3	56.1	106	113.5	68.4	54.2	115.4	82.4	47.4	34.4	22
Total Monthly Flow (m³)	140276.0	139054.0	159098.0	180267.0	172750.0	138447.0	112641.0	98448.0	93273.0	110466.0	137142.0	127859.0

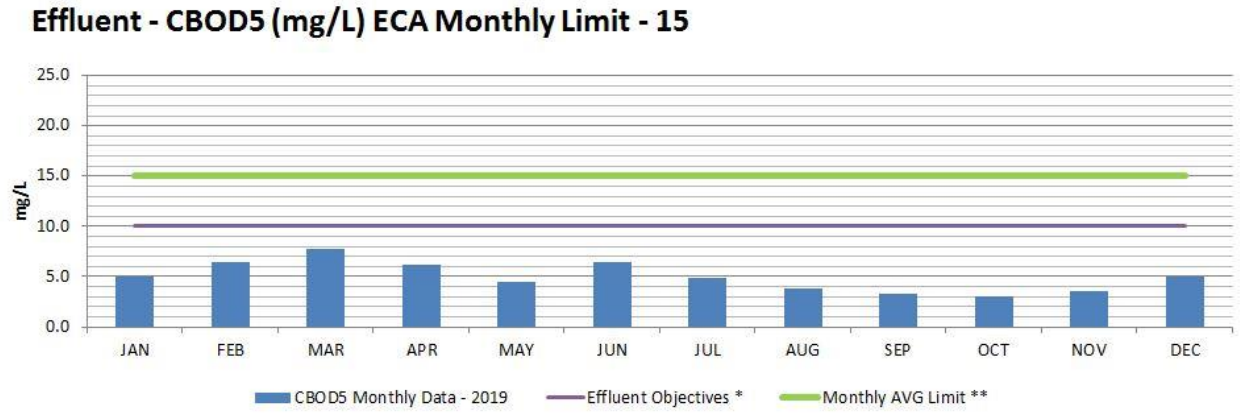
Carbonaceous Biological Oxygen Demand (CBOD) / Biological Oxygen Demand (BOD)

The Wastewater Treatment Plant (WWTP) is designed to handle a soluble BOD of 100 mg/L and a total BOD of 300 mg/L. The annual average raw sewage BOD_5 concentration to the plant was 340.3 mg/L with a maximum daily concentration of 842 mg/L. The annual average final effluent $CBOD_5$ concentration was 4.9 mg/L with a maximum daily concentration of 9 mg/L.

The daily and monthly objectives and limits were met for the 2019 reporting period. Efforts made to meet the objectives and limits include sampling the collection system to ensure we are receiving raw sewage that will not negatively affect the microbial activity. Sanitary effluent discharges are regulated by the Town of St. Marys By-law 46-2014.

If there was a heavy loading on the plant the air blowers are programmed to automatically compensate by increasing the amount of air into the aeration tanks. The dissolved oxygen levels are monitored on-line as well as by the operators to ensure adequate dissolved oxygen is supply at all times.



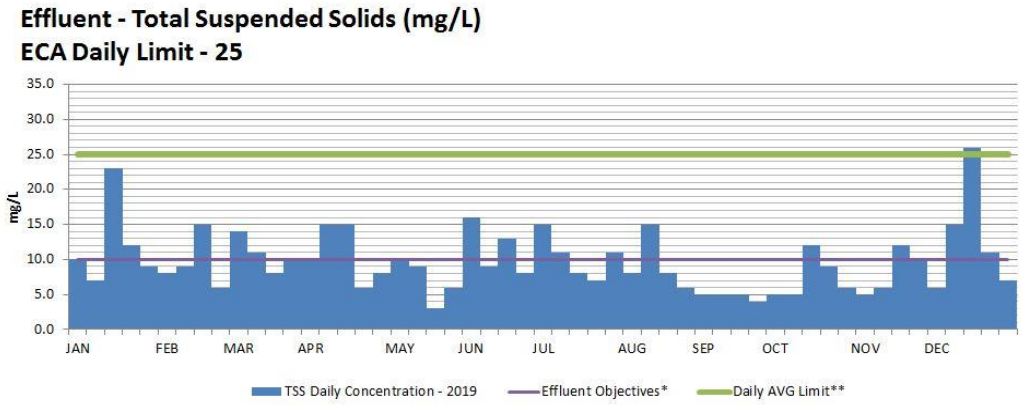


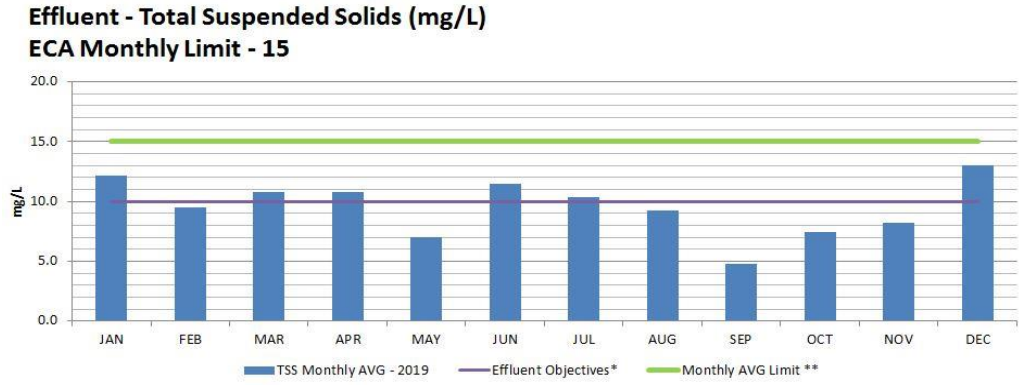
Total Suspended Solids (TSS)

The annual average raw sewage TSS concentration to the plant was 325 mg/L, with a maximum daily concentration of 2030 mg/L. The annual average final effluent TSS concentration was 9.6 mg/L with a maximum concentration of 26 mg/L.

December 17, 2019 - the daily limit for TSS is 25 mg/L and the result was 26 mg/l. We are relating this to a local industrial loading. This affected the microbial activity and caused lots of foam on the aeration tanks which caused higher than normal solids in the effluent. In order to rectify the foam operations closely monitored the dissolved oxygen. We have also had a vac truck in to take the foam out of the chamber. The Town of St. Marys was in communication with the local industry to make them aware of the situation.

Efforts are made by the operators to maintain the solids below the objectives by monitoring the process closely and making adjustments as required. There were instances that the daily and monthly results did not meet the objectives. Staff sample the effluent in-house to closely monitor and if required adjust the chemical dosages in attempts to remain below the objectives. Periodically the tanks and chambers are cleaned out to eliminate any foam or scum build-up that could cause high solids in the effluent. There is also the ability to change the return activated sludge flows which can assist in lowering the suspended solids in the effluent. The depths in the clarifiers are monitored and flows changed according to the levels of sludge. Frequent microbial assessments are also completed to monitor the effluent quality. Frequent sampling of industries is done by OCWA. Sanitary effluent discharges are regulated by the Town of St. Marys By-law 46-2014.

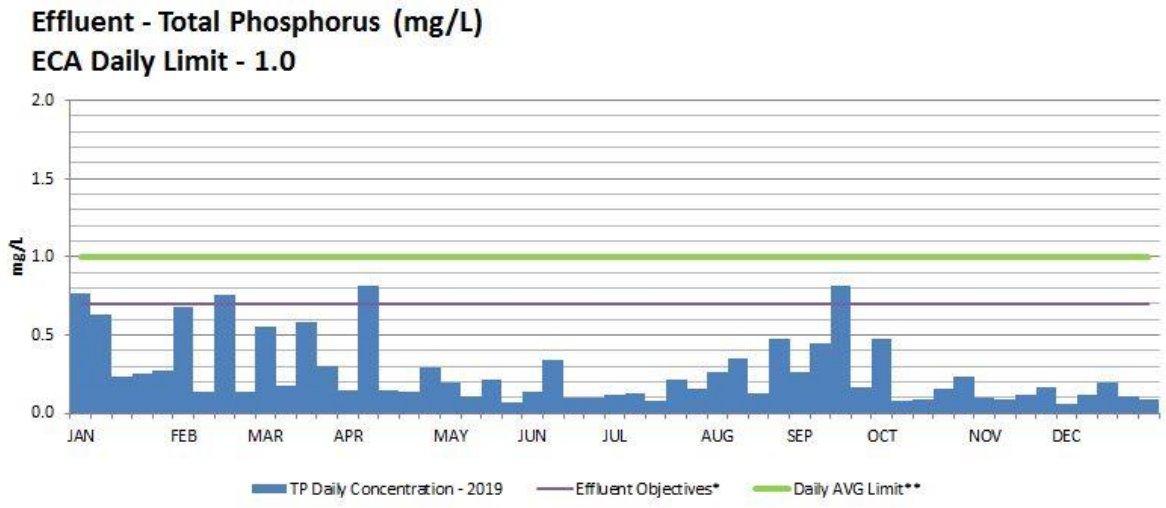


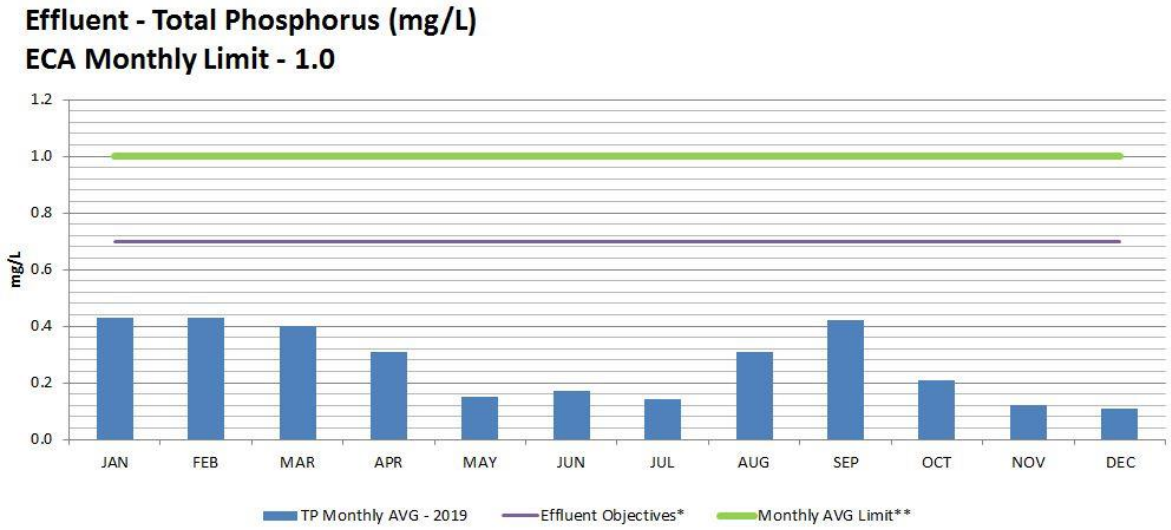


Total Phosphorus (TP)

The annual average raw sewage total phosphorus (TP) concentration to the plant was 4.7 mg/L with a maximum daily concentration of 19.8 mg/L. The annual average final effluent TP concentration was 0.26 mg/L with the maximum being 0.81 mg/L. There were no non-compliances to report for 2019.

The daily objectives were not consistently met for the 2019 reporting period. Efforts made to meet the objectives and limits include sampling the collection system to ensure we are receiving raw sewage that will not negatively affect the microbial activity. Sanitary effluent discharges are regulated by the Town of St. Marys By-law 46-2014. If there was a heavy loading on the plant the air blowers are programmed to automatically compensate by increasing the amount of air into the aeration tanks. Staff monitors the effluent for total phosphorus levels in-house and make the required aluminum sulphate and process adjustments as required.

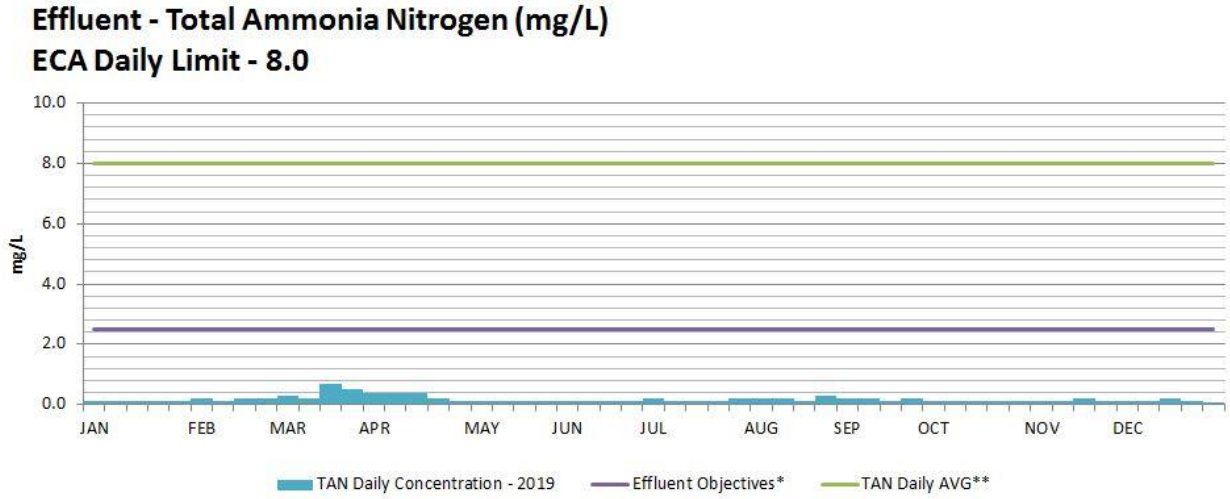


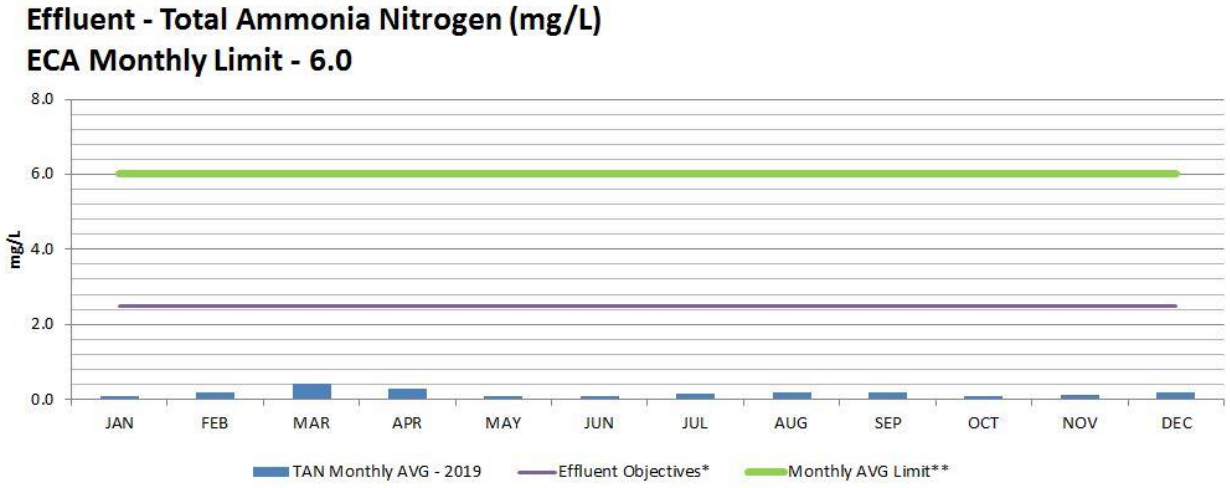


Total Ammonia Nitrogen (TAN)

The annual average raw sewage TAN concentration to the plant was 17.6 mg/L with a maximum daily concentration of 27.5 mg/L. The annual final effluent TAN concentration was 0.18 mg/L with a maximum daily concentration of 0.7 mg/L.

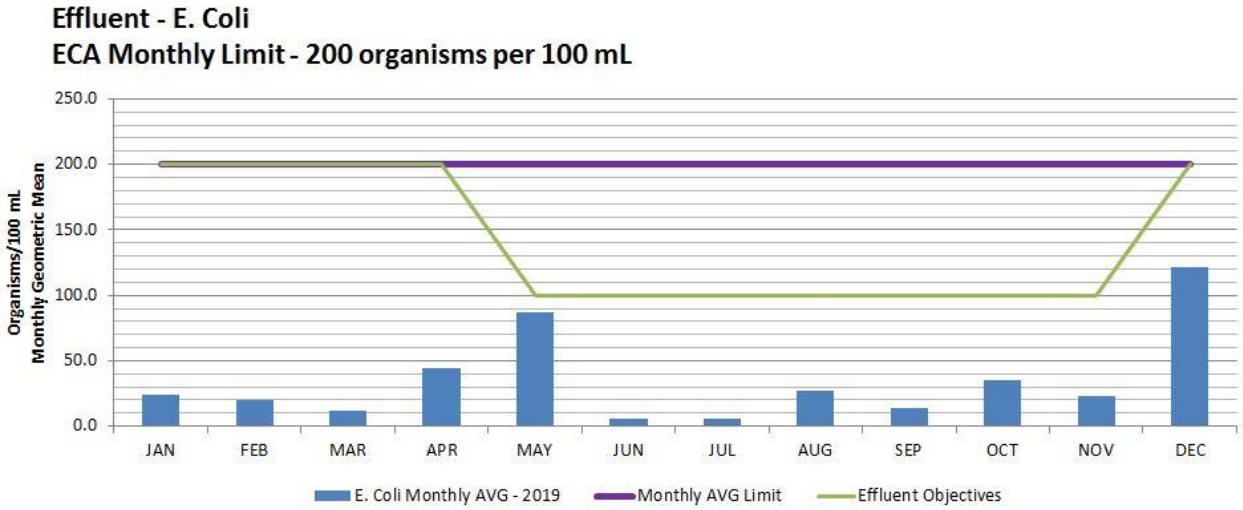
The daily and monthly limits were met for the 2019 reporting period. Efforts made to meet the objectives and limits include sampling the collection system to ensure we are receiving raw sewage that will not negatively affect the microbial activity. Sanitary effluent discharges are regulated by the Town of St. Marys By-law 46-2014. If there was a heavy loading on the plant the air blowers are programmed to automatically compensate by increasing the amount of air into the aeration tanks. Staff monitors the effluent for total ammonia nitrogen levels in-house and make the required aluminum sulphate and process adjustments as required.





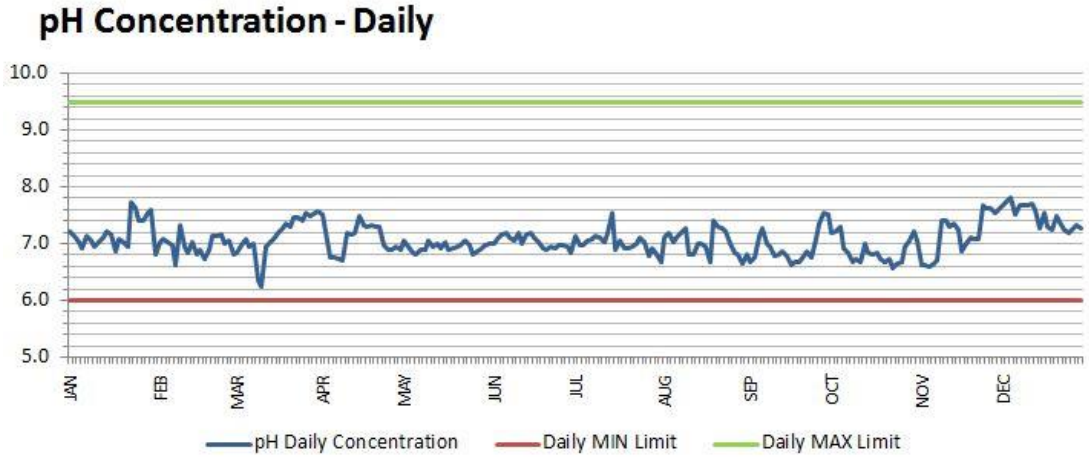
Escherichia coli (E.Coli)

E. Coli geometric mean density limits and objectives were met during the 2019 reporting period. Samples were taken on a weekly basis and sent to SGS Laboratories for analyzing. In order to maintain compliance operators completed monthly preventative maintenance on the UV system which consists of replacing bulbs and ballasts as required and cleaning UV bulbs and the channels. Daily checks on the units to ensure they are working properly are also completed during daily rounds.



pH (a figure expressing the acidity or alkalinity)

The limits and objectives for pH were met during the 2019 reporting period. Staff monitored the pH on a daily basis to ensure these limits were met. Efforts are made by the operators to maintain the pH below the objectives by monitoring the process closely and making adjustments to the aluminum sulphate dosage if required. The pH is also monitored in the collection system. Sanitary effluent discharges are regulated by the Town of St. Marys By-law 46-2014.

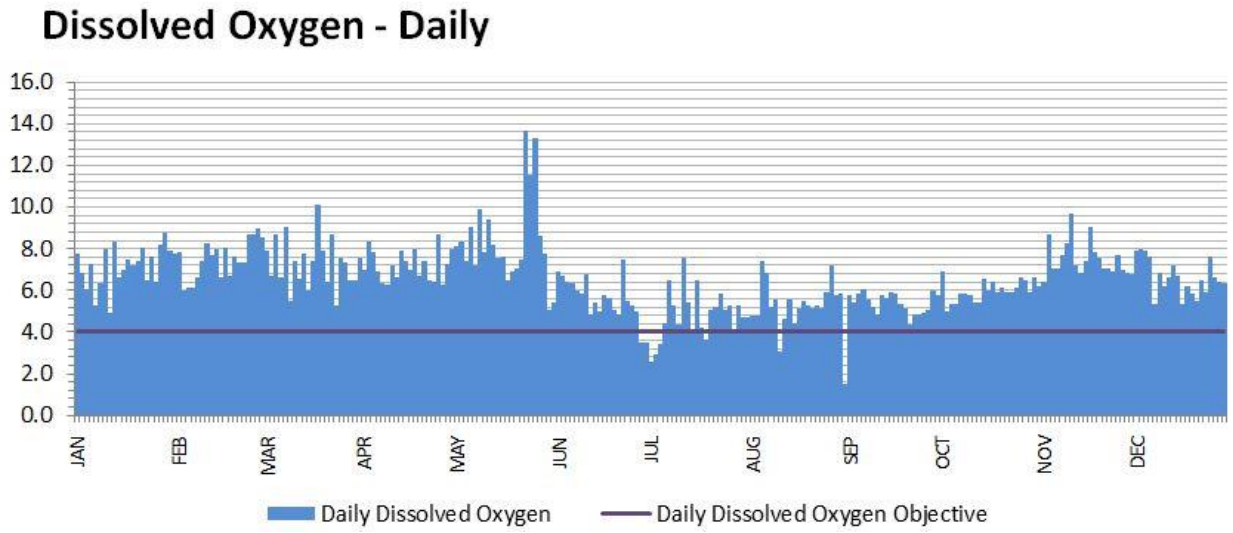


Dissolved Oxygen (D.O.)

There were a few days in 2019 that the daily objectives of 4.0 were not met.

There is an automated air blower that is programmed to automatically compensate by increasing the amount of air into the aeration tanks. Staff monitors the effluent for DO levels in-house and make the required process adjustments as required. At times the loadings on the plant have caused the daily objectives of 4.0 mg/l to not be met. Sanitary effluent discharges are regulated by the Town of St. Marys By-law 46-2014.

The Town of St. Marys has a by-law that is enforced with the local industries.



3.0 EFFLUENT QUALITY ASSURANCE

In order to attempt to meet the design objectives; effluent quality assurance is evaluated by monitoring parameters and changes throughout the plant processes. The operators monitor the basins by performing tests on the mixed liquor. These tests include dissolved oxygen, pH, temperature, settling tests, Mixed Liquor Suspended Solids (MLSS). As well, monitoring of the aluminum sulfate dosages and wasting volumes are completed. Data collected from these tests provide valuable information to the operator to make the appropriate adjustments in the treatment process and take corrective actions before the plant reaches its effluent limits.

Periodically the tanks are cleaned out to eliminate any foam or scum build-up that could cause high solids in the effluent.

All in-house monitoring equipment is calibrated based on the manufacturer's recommendations.

Annually a facility sampling schedule calendar is prepared and reviewed with operational staff; the sampling schedule calendar identifies sample collection dates to meet regulatory requirements of the ECA.

4.0 MAINTENANCE ACTIVITIES [PLANNED / UNPLANNED]

Regular scheduled monthly preventative maintenance is assigned and monitored using the Workplace Management System (WMS) program. The Work Management System (WMS) provides the framework of how OCWA manages and plans work such as maintenance and operational activities, and is the framework which is supported within our CMMS. (Computerized Maintenance Management System)

A method to prioritize maintenance requests is required to ensure that the top priority work is being pursued at all times. A method has been developed that balances risk, safety, environmental, customer, operations, financial and urgency factors and can be used by maintenance request initiators, maintenance planners and workers to ensure that the right work is being completed at the right time.

The result of this maintenance work prioritization is a plan for which resources can be prepared and allocated in an efficient manner.

OCWA's WMS uses data to support how work orders are scheduled. Work orders are prioritized according to the following three classifications:

1. **Emergency work** usually involves safety hazards, environmental concerns or major interruption of service. Repairs are generally initiated without waiting for work orders to be processed.
2. **Routine/Preventive maintenance work** does not require prioritizing, as it is always scheduled.
3. **Breakdown/Corrective maintenance work** is prioritized, planned and scheduled into the regular preventive maintenance program.

The preventive maintenance requirement is built into the regular work schedule and corrective maintenance work requests are added to the schedule according to the priority and workload of staff and availability of outside contractors. The following are the number of work orders generated and completed in 2019. For a summary of the maintenance performed please see Appendix B – WMS reports.

PREVENTATIVE MAINTENANCE WORK ORDERS GENERATED												
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
37	35	30	40	35	49	30	39	29	30	30	39	423

5.0 FUTURE ALTERATIONS

The Town of St. Marys, in collaboration with Ontario Clean Water Agency continue to investigate potential future alterations for the facility. Future alterations are being governed by a long term capital needs projection which covers a 20-year planning period. Planned future alterations or upgrades in the next few years consist of, but are not limited to:

- Construction of a new Grit Removal, Odour Control and Administration Building;
- Environmental Assessment for Capacity Expansion, as required

6.0 CALIBRATION AND MAINTENANCE PROCEDURES

In 2019 calibrations were completed by Pierce Services and Solutions Inc. for the flow meters at the facility. Pierce Services also calibrated all hand held and laboratory equipment. The backflow preventers were done by Curney Mechanical. Kone Cranes did the inspection of all lifting equipment/devices. Hetek Solutions Inc. calibrated all gas monitoring equipment and replaced faulty sensors as required. Sommers did the inspection of the emergency generators. Mobile Fire and Safety completed the inspection of all fire extinguishers. In-house meters for pH and dissolved oxygen are calibrated by OCWA operators as per manufacturer's instructions. Other annual maintenance items include annual boiler inspections and UV inspection and maintenance by H2Flow.

Other maintenance that occurred in 2019 include: rehabilitated and lined supernatant wetwell, replacement of plug valves and sluice gate valve in the overflow chamber, replacement of gas detection system in digester building, UV sensor replacement, WAS building heater replacement, re-build of Queen Street Pump Station pump #2, UPS replacement in WAS building, servicing of boilers, drum thickener HMI replacement, building door repairs for the screens room and WAS building, repairs to odour control unit, TSS sensor replacement, chamber clean-out, aeration tank piping repairs, dewatering auger repairs, raw sewage pump #2 repairs, Neuros blower annual maintenance, digester recirculation pump repairs, sludge storage tank hatch replacement, centrifuge polymer pump repairs and UV bulb and ballast replacements.

7.0 BIOSOLIDS

In the summer of 2016, Lystek International Inc. entered into a five (5) year agreement with the Town for marketing and management of the LysteGro fertilizer produced from the facility. Biosolids produced at the St. Marys WWTP are from the Lystek System which results in a federally registered fertilizer product with the Canadian Food Inspection Agency (CFIA). As such, the material is applied as a fertilizer, where the rate of application is based on soil characteristics and crop requirements.

In 2019 a total of 2,643 m3 of LysteGro product was hauled from St. Marys WWTP either to on-farm storage, or directly to field site. All material was applied using a tanker mounted injection system designed to ensure all material is applied below the soil surface, while causing minimal disturbance, reducing any nuisance odours and maximizing retention of ammonia-N.

The 2019 application season was a success for the St. Marys material which was marketed effectively and applied responsibly as a fertilizer. All hauling and application of material was

completed according to best practices in terms of nutrient management and in an economical fashion.

It is estimated that approximately 2,700 cubic metres will be produced in 2020. All biosolids sample analysis was carried out by SGS Lakefield Research Ltd.

8.0 BY-PASS, SPILLS OR ABNORMAL DISCHARGE

There were no abnormal discharge events for 2019.

There were no formal odour complaints in 2019 however, the Town of St. Marys is aware of odour issues associated with the WWTP and has taken steps to help alleviate those concerns. Steps taken in 2019 include the replacement of the activated carbon odour control unit for the Lystek process, including new absorptive media, repairs to the activated carbon unit for the headworks and sludge storage facility and the installation of a vent pipe, complete with carbon media filter on the newly rehabilitated supernatant wetwell.

9.0 NOTICE OF MODIFICATIONS

Limited operational flexibility allows for the sewage works under the current ECA to do certain modifications to the sewage works in accordance with the Terms and Conditions of the ECA.

There were no LOF's completed in 2019 although the Supernatant Well was being rehabilitated and lined to prevent future corrosion. This work was commissioned in January of 2020 and the Notice of Modification to Sewage Works form reflects this date. A copy of this notice can be found in ***Appendix C*** of this report.

10.0 REMOVAL RATES

Removal rates were as follows: $CBOD_5$ (99%), TSS (99%) and Total Phosphorus (99%) showing that overall removal processes have been effective.

**Objectives – The owner shall use best effort to operate the works with in the objectives*
***Limits – The owner shall operate and maintain the works such that the concentrations of the parameters are not exceeded in the effluent*

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Town of St. Marys

APPENDIX A

MONITORING DATA

Ontario Clean Water Agency
Performance Assessment Report Wastewater - St. Marys Wastewater Treatment Plant
January - December 2019

	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	<--Total-->	<--Avg.-->	<--Max.-->	<--Criteria-->
Flows:																
Raw Flow: Total - Raw Sewage (m^3)	140,276.0	139,054.0	159,098.0	180,267.0	172,750.0	138,447.0	112,641.0	98,448.0	93,273.0	110,466.0	137,142.0	127,859.0	1,609,721.0			
Raw Flow: Avg - Raw Sewage (m^3/d)	4,525.0	4,966.2	5,132.2	6,008.9	5,572.6	4,614.9	3,633.6	3,175.7	3,109.1	3,563.4	4,571.4	4,124.5		4,416.5		
Raw Flow: Max - Raw Sewage (m^3/d)	6,286.0	7,949.0	8,748.0	8,419.0	7,738.0	6,797.0	4,004.0	3,810.0	3,760.0	6,446.0	7,644.0	5,456.0			8,748.0	
Eff. Flow: Total - Final Effluent (m^3)	121,510.0	109,860.0	120,867.0	140,633.0	156,091.0	147,369.0	147,140.0	154,736.0	140,258.0	157,385.0	158,179.0	136,615.0	1,690,643.0			
Eff. Flow: Avg - Final Effluent (m^3/d)	3,919.7	3,923.6	3,898.9	4,687.8	5,035.2	4,912.3	4,746.5	4,991.5	4,675.3	5,076.9	5,272.6	4,406.9		4,628.9		
Eff. Flow: Max - Final Effluent (m^3/d)	5,340.0	5,663.0	7,148.0	5,923.0	8,792.0	6,900.0	5,667.0	5,568.0	5,669.0	7,054.0	7,157.0	5,831.0			8,792.0	
Carbonaceous Biochemical Oxygen Demand: CBOD:																
Eff: Avg cBOD5 - Final Effluent (mg/L)	5	6.5	7.75	6.2	4.5	6.5	4.8	3.75	< 3.25	< 3	3.5	5		< 4.98	7.75	
Eff: # of samples of cBOD5 - Final Effluent (mg/l	5	4	4	5	4	4	5	4	4	5	4	5	53			
Loading: cBOD5 - Final Effluent (kg/d)	19.60	25.50	30.22	29.06	22.66	31.93	22.78	18.72	< 15.20	< 15.23	18.45	22.04		< 22.62	31.93	
Biochemical Oxygen Demand: BOD5:																
Raw: Avg BOD5 - Raw Sewage (mg/L)	291.6	376.5	193.75	217.8	184.5	284.5	332.8	310.5	461.75	421.2	572.5	436.2		340.30	572.5	
Raw: # of samples of BOD5 - Raw Sewage (mg/L)	5	4	4	5	4	4	5	4	4	5	4	5	53			
Total Suspended Solids: TSS:																
Raw: Avg TSS - Raw Sewage (mg/L)	238	343	204	188.6	184	247.25	251.8	210.5	321	348.2	827	540.2		325.30	827	
Raw: # of samples of TSS - Raw Sewage (mg/L)	5	4	4	5	4	4	5	4	4	5	4	5	53			
Eff: Avg TSS - Final Effluent (mg/L)	12.2	9.5	10.75	10.8	7	11.5	10.4	9.25	4.75	7.4	8.25	13		9.567	13	15
Eff: # of samples of TSS - Final Effluent (mg/L)	5	4	4	5	4	4	5	4	4	5	4	5	53			
Loading: TSS - Final Effluent (kg/d)	47.82	37.27	41.91	50.63	35.25	56.49	49.36	46.17	22.21	37.57	43.50	57.29		43.789	57.29	
Percent Removal: TSS - Raw Sewage (mg/L)	94.87	97.23	94.73	94.27	96.20	95.35	95.87	95.61	98.52	97.88	99.00	97.59			99.00	
Total Phosphorus: TP:																
Raw: Avg TP - Raw Sewage (mg/L)	3.26	4.23	3.968	2.578	2.498	2.995	3.718	4.31	4.853	4.886	10.898	8.6		4.733	10.898	
Raw: # of samples of TP - Raw Sewage (mg/L)	5	4	4	5	4	4	5	4	4	5	4	5	53			
Eff: Avg TP - Final Effluent (mg/L)	0.43	0.43	0.403	0.308	0.145	0.17	0.14	0.305	0.423	0.208	0.12	0.114		0.266	0.43	1
Eff: # of samples of TP - Final Effluent (mg/L)	5	4	4	5	4	4	5	4	4	5	4	5	53			
Loading: TP - Final Effluent (kg/d)	1.69	1.69	1.57	1.44	0.73	0.84	0.67	1.52	1.98	1.06	0.63	0.50		1.19	1.98	
Percent Removal: TP - Raw Sewage (mg/L)	86.8	89.8	89.9	88.1	94.2	94.3	96.2	92.9	91.3	95.7	98.9	98.7			98.9	
Nitrogen Series:																
Raw: Avg TKN - Raw Sewage (mg/L)	26.0	23.1	18.0	17.4	17.8	19.8	30.3	32.0	34.7	32.9	47.1	45.3		28.7	47.1	
Raw: # of samples of TKN - Raw Sewage (mg/L)	5	4	4	5	4	4	5	4	4	5	4	5	53			
Eff: Avg TAN - Final Effluent (mg/L)	< 0.1	< 0.175	0.425	< 0.3	< 0.1	< 0.1	0.14	0.2	< 0.175	< 0.1	< 0.125	< 0.2		< 0.18	0.43	
Eff: # of samples of TAN - Final Effluent (mg/L)	5	4	4	5	4	4	5	4	4	5	4	5	53			
Loading: TAN - Final Effluent (kg/d)	< 0.392	< 0.687	1.657	< 1.406	< 0.504	< 0.491	0.665	0.998	< 0.818	< 0.508	< 0.659	< 0.881		< 0.81	1.66	
Disinfection:																
Eff: GMD E. Coli - Final Effluent (cfu/100mL)	24.39	20.04	11.89	44.55	87.42	6.70	5.55	27.36	14.11	35.48	22.52	121.01		35.08	121	200
Eff: # of samples of E. Coli - Final Effluent (cfu/100m	5	4	4	5	4	4	5	4	4	5	4	5	53			
Final Effluent / Dissolved Oxygen: DO - mg/L																
Max In-house	8.76	8.94	10.14	8.69	13.66	7.47	7.56	7.42	6.05	6.92	9.68	8			13.66	
Mean In-house	7.162	7.504	7.308	7.198	8.36	5.579	4.812	5.229	5.403	5.985	7.497	6.634		6.55		
Min In-house	4.94	6	5.31	6.29	5.07	3.5	2.55	1.49	4.32	5.01	6.39	5.37				1.49
Final Effluent / pH - ---																
Max In-house	7.74	7.32	7.58	7.51	7.06	7.19	7.53	7.4	7.55	7.29	7.69	7.81			7.81	
Mean In-house	7.18	6.98	7.15	7.09	6.94	7.03	7.01	7.02	6.95	6.88	7.16	7.48		7.07		
Min In-house	6.8	6.63	6.25	6.71	6.8	6.83	6.67	6.65	6.61	6.58	6.59	7.19				6.25
Final Effluent / Temperature - °C																
Max In-house	17.3	16.6	17.9	18	18.1	23.5	24.3	23	21.3	21.5	18.9	19.9			24.3	
Mean In-house	13	11	13	13	15	18	21	21	20	18	16	14		16		
Min In-house	7.8	8.3	7.8	8.5	11.1	14.2	18.6	19.5	16.7	14.3	11.3	11.7				7.8

APPENDIX B

WMS REPORT

Work Order List

Work Order	Description of Work	Location Description
1218940	Sludge Loading Pump Inspection 5520	5520-WWSM-P-SH-DGST
1421480	New Supernate Well Construction	5520-WWSM
1500251	TSS Sensor Issues	5520-WWSM
1500848	TSS Sensor Replacement 5520 WWSM	5520-WWSM-P-PC
1506192	Filter Air 01 Carbon Sludge Insp/Service (1y) 5520	5520-WWSM-P-ST-AERA
1506426	Daily O&M Activities Emily Pumping Station (1m) 5520	5520-SPEM
1506431	TPM Insp/Maint Emily Pumping Station (1m) 5520	5520-SPEM
1506436	Daily O&M Activities Queen Pumping Station (1m) 5520	5520-SPQN
1506441	TPM Insp/Maint Queen Pumping Station (1m) 5520	5520-SPQN
1506446	Daily O&M Activities Robinson Pumping Station (1m) 5520	5520-SPRB
1506451	TPM Insp/Maint Robinson Pumping Station (1m) 5520	5520-SPRB
1506729	UV Light Bank 02 Effluent Insp/Clean/Service (1m/1y) 5520	5520-WWSM-P-DI
1506736	UV Light Bank 01 Effluent Insp/Clean/Service (1m/1y) 5520	5520-WWSM-P-DI
1506743	Engine Diesel St. Marys WWTP Insp/Test (1m) 5520	5520-WWSM-F-PG
1506762	Engine Diesel St. Marys WWTP Insp/Service (1y) 5520	5520-WWSM-F-PG
1506856	Engine Diesel Robinson St Insp/Service (1y) 5520	5520-SPRB
1507279	OG15 Facility OHSA Inspection (1m) 5520	5520-WWSM
1507533	Sampling and Testing (1m) 5520	5520-WWSM
1535770	Aeration Recirc Pump PM 5520	5520-WWSM-P-PI
1535931	Sampling Calendar Review (1y) 5520	5520-WWSM
1536627	ESA CSS INSPECTIONS 5520	5520-WWSM
1537206	Replacement Bulbs for UV System - 5520- WWSM	5520-WWSM-P-DI
1544602	Sampler 01 Raw Influent Service (1y) 1221	5520-WWSM-P-PC
1544722	Blower Centrifugal 02 Aeration Insp/Service (1y) 5520	5520-WWSM-P-ST-AERA
1544730	Blower Centrifugal 03 Aeration Insp/Service (1y) 5520	5520-WWSM-P-ST-AERA
1544742	Alarm Dialer Testing (1m) 5520	5520-WWSM-P-PC
1544747	Alarm Dialer 01 Queen PS Testing (1m) 5520	5520-SPQN
1544752	Alarm Dialer 01 Robinson PS Testing (1m) 5520	5520-SPRB
1545005	PH Probe Insp/Calib (1m) 5520	5520-WWSM
1545010	Daily O&M Activities Emily Pumping Station (1m) 5520	5520-SPEM
1545015	TPM Insp/Maint Emily Pumping Station (1m) 5520	5520-SPEM
1545020	Daily O&M Activities Queen Pumping Station (1m) 5520	5520-SPQN
1545025	TPM Insp/Maint Queen Pumping Station (1m) 5520	5520-SPQN
1545030	Daily O&M Activities Robinson Pumping Station (1m) 5520	5520-SPRB
1545035	TPM Insp/Maint Robinson Pumping Station (1m) 5520	5520-SPRB
1545040	TPM Insp/Maint St Marys WWTP (1m) 5520	5520-WWSM
1545295	Tank Clarifier 01 Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-CLAR
1545305	Tank Clarifier 03 Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-CLAR
1545315	Tank Clarifier 04 Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-CLAR
1545325	Uv Light Bank 02 Effluent Insp/Clean/Service (1m/1y) 5520	5520-WWSM-P-DI
1545332	Uv Light Bank 01 Effluent Insp/Clean/Service (1m/1y) 5520	5520-WWSM-P-DI
1545339	Engine Diesel St. Mary's WWTP Insp/Test (1m) 5520	5520-WWSM-F-PG
1545358	Pump Cent 01 Return Sludge Insp/Service (1m/1y) 5520	5520-WWSM-P-TT
1545368	Pump Cent 02 Return Sludge Insp/Service (1m/1y) 5520	5520-WWSM-P-TT
1545378	Pump Cent 03 Return Sludge Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-PIPE
1545388	Pump Rot Lobe Insp/Service (1m/1y) 5520	5520-WWSM-P-TT
1545394	Engine Diesel Robinson St PS Insp/Test (1m) 5520	5520-SPRB
1545662	Blower Cent Turbo Insp/Service (1m/3m/1y) 5520	5520-WWSM-P-ST-AERA
1545763	OG15 Facility OHSA Inspection (1m) 5520	5520-WWSM
1546178	Sampling and Testing (1m) 5520	5520-WWSM
1546363	Alarm Dialer 01 Emily St. PS Testing (1m) 5520	5520-SPEM
1573826	Tank Clarifier Inspection/Matinance (1m) 5520	5520-WWSM-P-ST-CLAR
1584485	Repair Water Supply Line to Steam Boiler Preheat Tank	5520-WWSM-P-PI
1584557	RawSewage Bldg - H2S Sensor replacement - 5520 -WWSM	5520-WWSM
1584591	Replace Belts on Sludge Storage Odor Control Cnit	5520-WWSM-F-HV
1584665	Replaced Lines on Industrial Samplers	5520-WWSM-P
1585389	Constructed Mixer for Poly	5520-WWSM-P-SH
1585741	Robinson St Plug Install	5520-SPRB
1586577	02 sensor replacement Wetwell - 5520 WWSM	5520-WWSM
1587511	New Water Lines Blower Building	5520-WWSM-F
1592557	Lifting Device Route (1y) 5520	5520-WWSM
1592638	Alarm Dialer Testing (1m) 5520	5520-WWSM-P-PC

1592643	Alarm Dialer 01 Queen PS Testing (1m) 5520	5520-SPQN
1592648	Alarm Dialer 01 Robinson PS Testing (1m) 5520	5520-SPRB
1592653	Pump Cent Sludge Loading Insp/Service (1y) 5520	5520-WWSM-P-SH-DGST
1592882	PH Probe Insp/Calib (1m) 5520	5520-WWSM
1592887	Daily O&M Activities Emily Pumping Station (1m) 5520	5520-SPEM
1592892	TPM Insp/Maint Emily Pumping Station (1m) 5520	5520-SPEM
1592897	Daily O&M Activities Queen Pumping Station (1m) 5520	5520-SPQN
1592902	TPM Insp/Maint Queen Pumping Station (1m) 5520	5520-SPQN
1592907	Daily O&M Activities Robinson Pumping Station (1m) 5520	5520-SPRB
1592912	TPM Insp/Maint Robinson Pumping Station (1m) 5520	5520-SPRB
1592917	TPM Insp/Maint St Marys WWTP (1m) 5520	5520-WWSM
1593155	Tank Clarifier 01 Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-CLAR
1593165	Tank Clarifier 03 Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-CLAR
1593175	Tank Clarifier 04 Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-CLAR
1593185	Uv Light Bank 02 Effluent Insp/Clean/Service (1m/1y) 5520	5520-WWSM-P-DI
1593192	Uv Light Bank 01 Effluent Insp/Clean/Service (1m/1y) 5520	5520-WWSM-P-DI
1593199	Engine Diesel St. Mary's WWTP Insp/Test (1m) 5520	5520-WWSM-F-PG
1593218	Pump Cent 01 Return Sludge Insp/Service (1m/1y) 5520	5520-WWSM-P-TT
1593228	Pump Cent 02 Return Sludge Insp/Service (1m/1y) 5520	5520-WWSM-P-TT
1593238	Pump Cent 03 Return Sludge Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-PIPE
1593248	Pump Rot Lobe Insp/Service (1m/1y) 5520	5520-WWSM-P-TT
1593254	Engine Diesel Robinson St PS Insp/Test (1m) 5520	5520-SPRB
1593511	Blower Cent Turbo Insp/Service (1m/3m/1y) 5520	5520-WWSM-P-ST-AERA
1593896	Sampling and Testing (1m) 5520	5520-WWSM
1594024	Alarm Dialer 01 Emily St. PS Testing (1m) 5520	5520-SPEM
1612741	Tank Clarifier 02 Inspection/Maintenance (1m) 5520	5520-WWSM-P-ST-CLAR
1622868	Raw Sewage Pump#2 Repairs 5520	5520-WWSM-P-HW
1623108	HMI screen issues	5520-WWSM
1623686	#4 RAS Pump - Pressure Sensor	5520-WWSM-P-PC
1624078	Trouble Shot Pump #2 Overload Issues 5520	5520-SPQN
1624400	Pump #1 Ground Fault	5520-WWSM-P-HW
1624413	Communication Fail @ WPCP (Devicenet in CP11)	5520-WWSM-F
1624664	Drum Thickener Injection Issues	5520-WWSM
1630285	Alarm Dialer Testing (1m) 5520	5520-WWSM-P-PC
1630290	Alarm Dialer 01 Queen PS Testing (1m) 5520	5520-SPQN
1630295	Alarm Dialer 01 Robinson PS Testing (1m) 5520	5520-SPRB
1630300	Sampler 01 Auto Effluent Insp/Service (1y) 5520	5520-WWSM-P-PC
1630508	PH Probe Insp/Calib (1m) 5520	5520-WWSM
1630513	Daily O&M Activities Emily Pumping Station (1m) 5520	5520-SPEM
1630518	TPM Insp/Maint Emily Pumping Station (1m) 5520	5520-SPEM
1630523	Daily O&M Activities Queen Pumping Station (1m) 5520	5520-SPQN
1630528	TPM Insp/Maint Queen Pumping Station (1m) 5520	5520-SPQN
1630533	Daily O&M Activities Robinson Pumping Station (1m) 5520	5520-SPRB
1630538	TPM Insp/Maint Robinson Pumping Station (1m) 5520	5520-SPRB
1630543	TPM Insp/Maint St Marys WWTP (1m) 5520	5520-WWSM
1630766	Tank Clarifier 01 Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-CLAR
1630776	Tank Clarifier 03 Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-CLAR
1630786	Tank Clarifier 04 Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-CLAR
1630796	Uv Light Bank 02 Effluent Insp/Clean/Service (1m/1y) 5520	5520-WWSM-P-DI
1630803	Uv Light Bank 01 Effluent Insp/Clean/Service (1m/1y) 5520	5520-WWSM-P-DI
1630810	Engine Diesel St. Marys WWTP Insp/Test (1m) 5520	5520-WWSM-F-PG
1630829	Pump Cent 01 Return Sludge Insp/Service (1m/1y) 5520	5520-WWSM-P-TT
1630839	Pump Cent 02 Return Sludge Insp/Service (1m/1y) 5520	5520-WWSM-P-TT
1630849	Pump Cent 03 Return Sludge Insp/Service (1m/1y) 5520	5520-WWSM-P-ST-PIPE
1630859	Pump Rot Lobe Insp/Service (1m/1y) 5520	5520-WWSM-P-TT
1630865	Engine Diesel Robinson St PS Insp/Test (1m) 5520	5520-SPRB
1631135	Blower Cent Turbo Insp/Service (1m/3m/1y) 5520	5520-WWSM-P-ST-AERA
1631244	OG15 Facility OHSA Inspection (1m) 5520	5520-WWSM
1631507	Sampling and Testing (1m) 5520	5520-WWSM
1631648	Alarm Dialer 01 Emily St. PS Testing (1m) 5520	5520-SPEM
1651941	Tank Clarifier 02 Inspection/Maintenance (1m) 5520	5520-WWSM-P-ST-CLAR
1652501	Engine Diesel Queen St PS Insp/Test (1m) 5520	5520-SPQN
1662109	Detroiter cleaning	5520-WWSM-P-HW

APPENDIX C

NOTICE OF MODIFICATIONS

Ontario
Ministry of
the Environment

Notice of Modification to Sewage Works

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA AND SEND A COPY TO THE WATER SUPERVISOR (FOR MUNICIPAL) OR DISTRICT MANAGER (FOR NON-MUNICIPAL SYSTEMS)

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility

(Insert the ECA's owner, number and issuance date and notice number, which should start with '01' and consecutive numbers thereafter)

ECA Number	Issuance Date (mm/dd/yy)	Notice number (if applicable)
4934-AH9S98	02/24/17	

ECA Owner	Municipality
Town of St. Marys	Town of St. Marys

Part 2: Description of the modifications as part of the Limited Operational Flexibility

(Attach a detailed description of the sewage works)

See attached page.

Description shall include:
1. A detail description of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.)
2. Confirmation that the anticipated environmental effects are negligible.
3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e. submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency plan, etc.)

Part 3 – Declaration by Professional Engineer

I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:
1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario;
2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA;
3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name (Print)	PEO License Number
Ryan DeVries	100183886
Signature	Date (mm/dd/yy)
	01/16/2020
Name of Employer	
B. M. Ross and Associates Limited	

Part 4 – Declaration by Owner

I hereby declare that:
1. I am authorized by the Owner to complete this Declaration;
2. The Owner consents to the modification; and
3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA.
4. The Owner has fulfilled all applicable requirements of the *Environmental Assessment Act*.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name of Owner Representative (Print)	Owner representative's title (Print)
DAVE BLAKE	ENVIRONMENTAL SERVICES SUPERVISOR
Owner Representative's Signature	Date (mm/dd/yy)
	01/20/20

Notes for Notice of Modification
St. Marys WPCP Supernatant Wetwell – Page 25, Part 2

The existing supernatant wetwell structure has been rehabilitated and lined to prevent future corrosion. Process piping and pumps within the wetwell were replaced, with slightly larger pumps (15 L/s at 9.5 m TDH) to accommodate proposed future flow from a future new inlet works building. This work proceeded under the LOF clause in the existing ECA for the following reasons:

- The existing supernatant wetwell is not currently described in the existing ECA under "Works" and does not appear to currently have a defined rated capacity.
- Although existing pumps have been replaced with larger, the existing rated capacity of the Plant is not changed. The inflow to the supernatant wetwell is not anticipated to change until the new inlet works is constructed. The new inlet works will require an amendment to the existing ECA.
- The rehabilitation of the supernatant wetwell occurred within the existing WPCP site limits.
- Point of discharge is unchanged.

In addition to the above work, 5 existing 150mm dia. plug valves were replaced, as well as the Plant's 750mm square sluice gate valve in the overflow chamber adjacent to the main inlet pumping station. Refer to the drawings dated January 15, 2020 for an indication of the location of these valves.

The descriptions in the existing ECA are still accurate and no revisions are required based on the work completed and described above.